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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/581,934	04/02/2007	Michael Chung Kau Liu	M03B343	2166
71134                      7590                      09/02/2010 Edwards Vacuum, Inc. 2041 MISSION COLLEGE BOULEVARD SUITE 260 SANTA CLARA, CA 95054				
EXAMINER				
EASTMAN, AARON ROBERT				
ART UNIT		PAPER NUMBER		
3745				
NOTIFICATION DATE		DELIVERY MODE		
09/02/2010		ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

LORETTA.SANDOVAL@EDWARDSVACUUM.COM

### Office Action Summary

**Application No.**

10/581,934

**Applicant(s)**

LIU ET AL.

**Examiner**

Aaron R. Eastman

**Art Unit**

3745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 April 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-11, 13-26, 32-34, 37 and 41-43 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 4-7, 9, 10, 22, 23, 26, 32-37 and 40-43 is/are rejected.
- 7) ☒ Claim(s) 2, 3, 8, 11, 13-21, 24 and 25 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 June 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-940)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 06/06/2006
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 32 and 33 are rejected under 35 U.S.C. 102(b) as being anticipated by USP 6,179,573 (Hablanian hereinafter).

3. In re claim 32 Hablanian discloses a vacuum pump (Fig. 1) comprising a multi-stage (130, 132, 134, etc.) centrifugal compressor mechanism comprising a plurality of rotor elements mounted on a rotatably mounted drive shaft (156), and, upstream therefrom, a molecular drag mechanism comprising at least one rotor element mounted on the drive shaft, wherein the at least one rotor element of the molecular drag mechanism at least partially surrounds a motor (150) for rotating the drive shaft (Hablanian discloses in col. 1 lines 7-10 and 44-49 that a molecular drag pump may be part of the final assembly, though it is not shown in the figures. Col. 2 lines 20-51 disclose that one or more of the pumping stages comprises a molecular drag stage and that the pumping stages are disposed around the motor.).

4. In re claim 33 Hablanian discloses the vacuum pump according to claim 32 wherein said at least one rotor element of the molecular drag pumping mechanism

comprises a cylinder mounted for rotary movement with the rotor elements of the compressor mechanism (col. 1 lines 44-49).

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hablanian in view of USP 5,611,660 (Wong et al. hereinafter).

7. In re claim 37 Hablanian discloses a vacuum pumping arrangement, wherein vacuum pump comprises a multi-stage centrifugal compressor mechanism comprising a plurality of rotor elements mounted on a rotatably mounted drive shaft, and, upstream therefrom, a molecular drag mechanism comprising at least one rotor element mounted on the drive shaft, wherein the at least one rotor element of the molecular drag mechanism at least partially surrounds a motor for rotating the drive shaft.

8. Hablanian does not disclose a booster vacuum pump in series with a backing pump.

9. Wong et al. teaches providing a backing pump for use with a vacuum pump (col. 1 lines 21-27).

10. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Hablanian by comprising a booster

vacuum pump in series with a backing pump as taught in Wong et al. for the purposes providing backing pressure (col. 1 lines 21-27 of Wong et al.).

11. Claims 1, 4-7, 9, 10, 22, 40 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hablanian in view of Wong et al. and in further view of USP 2,297,853 (Zetterquist hereinafter).

12. In re claim 1 the Hablanian modification in re claim 37 discloses the vacuum pump arrangement according to claim 37 wherein the multi-stage centrifugal compressor mechanism comprising comprises a housing (110), within which the drive shaft (156) is rotatably mounted within the housing (110), a plurality of fixed members (140) disposed within the housing and defining a plurality of interconnected fluid chambers, the rotor elements of the compressor mechanism comprising a plurality of impellers (142) mounted on the drive shaft (156) and disposed relative to the fixed members (140) such that each impeller delivers compressed fluid to a respective fluid chamber.

13. The Hablanian modification in re claim 37 does not disclose the compressor mechanism further comprising a bypass channel extending between two of the fluid chambers to enable fluid to pass between those chambers without compression, and means for controlling the flow of fluid through the bypass channel.

14. Zetterquist teaches a bypass channel extending between two fluid chambers to enable fluid to pass between those chambers without compression, and means for controlling the flow of fluid through the bypass channel (see Fig.'s 3 and 5 and col. 1 lines 9-13).

15. It would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the apparatus of the Hablanian modification in re claim 37 by further comprising a bypass channel extending between two of the fluid chambers to enable fluid to pass between those chambers without compression, and means for controlling the flow of fluid through the bypass channel as taught in Zetterquist for the purposes of insuring increased clearance in seals incident to starting and stopping the turbine (col. 1 lines 1-8 of Zetterquist).

16. In re claim 4 the Hablanian modification in re claim 1 discloses the vacuum pump arrangement according to claim 1 wherein said two of the fluid chambers are adjacent fluid chambers of the compressor mechanism.

17. In re claim 5 the Hablanian modification in re claim 1 discloses the vacuum pump arrangement according to claim 4 wherein the bypass channel passes through the fixed member located between the adjacent fluid chambers (see Fig. 5 of Zetterquist).

18. In re claim 6 the Hablanian modification in re claim 1 discloses the vacuum pump arrangement according to claim 1 wherein the control means comprises valve means (the ball check valve of Zetterquist, Fig. 3).

19. In re claim 7 the Hablanian modification in re claim 1 discloses the vacuum pump arrangement according to claim 6 wherein the valve means comprises a valve member displaceable in use between a closed position and an open position by pressurized fluid.

20. In re claim 9 the Hablanian modification in re claim 1 discloses the vacuum pump arrangement according to claim 6 wherein the valve means is located within a fluid chamber (Fig. 5 of Zetterquist).
21. In re claim 10 the Hablanian modification in re claim 1 discloses the vacuum pump arrangement according to claim 1 comprising, for each fluid chamber, a respective bypass channel extending between that fluid chamber and the adjacent downstream fluid chamber, and means for controlling the flow of fluid through each bypass channel (Fig. 5 of Zetterquist).
22. In re claim 22 the Hablanian modification in re claim 1 discloses the vacuum pump arrangement according to claim 1 wherein each fixed member comprises a disc mounted on, or integral with, a respective part of the housing (Fig. 1 of Hablanian).
23. In re claim 40 the Hablanian modification in re claim 1 discloses the vacuum pumping arrangement according to claim 37 comprising a bypass conduit connected between an exhaust from the booster pump and an exhaust from the backing pump, and means for controlling the flow of fluid through the bypass conduit (Fig. 3 of Zetterquist).
24. In re claim 41 the Hablanian modification in re claim 1 discloses a vacuum pump according to claim 37 wherein the molecular drag mechanism defines a plurality of flow channels that each receive fluid from a pump inlet and exhaust pumped fluid to a common exhaust port.

25. Claims 23 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hablanian in view of Wong et al. and Zetterquist and in further view of USP 5,848,873 (Hayashi et al. hereinafter).

26. In re claim 23 the Hablanian modification in re claim 1 discloses all of the limitations except for comprising means for cooling the fixed members.

27. Hayashi et al. teach means for cooling fixed members of a vacuum pump with a water cooling jacket (40a).

28. It would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the apparatus of 23 the Hablanian modification in re claim 1 by further comprising means for cooling the fixed members with a cooling jacket as taught in Hayashi et al. for the purposes of controlling temperature.

29. In re claim 26 the Hablanian modification in re claim 23 discloses the vacuum pump arrangement according to claim 1 comprising a cooling jacket (40a of Hayashi et al.) extending about at least part of the multi-stage centrifugal compressor mechanism.

30. Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hablanian in view of USP 5,513,499 (deRijke hereinafter).

31. In re claim 34 Hablanian discloses all of the limitations except for comprising means for monitoring the temperature of the pump, and means for controlling the speed of rotation of the shaft in dependence on the monitored temperature.

32. deRijke teaches means for monitoring the temperature of a pump (60, 62), and means for controlling (66) the speed of rotation of a shaft in dependence on the monitored temperature (col. 5 lines 40-52).



33. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Hablanian by adding a means for monitoring the temperature of the pump, and means for controlling the speed of rotation of the shaft in dependence on the monitored temperature as taught in deRijke for the purposes of preventing overheating.

34. Claims 42 and 43 rejected under 35 U.S.C. 103(a) as being unpatentable over Hablanian in view of Wong et al. and in further view of USP 5,848,873 (Schofield hereinafter).

35. In re claim 42 the Hablanian modification in re claim 37 discloses all of the limitations except for wherein the molecular drag mechanism is a multi-stage molecular drag mechanism.

36. Schofield teaches a multi-stage molecular drag mechanism (Fig.'s 1 and 2).

37. It would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the apparatus of the Hablanian modification in re claim 37 by providing a molecular drag mechanism that is a multi-stage molecular drag mechanism as taught in Schofield for the purposes of increasing the vacuum.

38. In re claim 43 the Hablanian modification in re claim 42 discloses all of the limitations.

***Allowable Subject Matter***

39. Claims 2, 3, 8, 11, 13-21, 24 and 25 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

40. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. USP's 6217278, 6435811, 7134835, 7160081 and 7240536 all disclose a pump where the motor is radially internal of the rotor. USP's 3572960, 3668393, 3751909 and 6155097 all disclose a pump with a valve controlled bypass. USP 6638010 and USPAP 2002/0064451 both disclose a pump with a molecular drag stage.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Aaron R. Eastman whose telephone number is (571)270-3132. The examiner can normally be reached on Mon-Thu 9:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Look can be reached on (571) 272-4820. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Aaron R. Eastman/  
Examiner, Art Unit 3745

/Edward K. Look/  
Supervisory Patent Examiner, Art Unit 3745